REMARKS

The Specification and the Abstract have both been amended. Claims 1, 8 and 15 have been amended. Claims 1-20 remain for further consideration. No new matter has been added.

The rejections and objections shall be taken up in the order presented in the Official Action.

1. Claims 1-20 remain following entry of this Amendment.

2-4. Claims 1-7 and 15-20 currently stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent 6,929,728 to Frerichs (hereinafter "Frerichs") in view of U.S. Patent 6,525,390 to Tada et al. (hereinafter "Tada").

Claim 1

Claim 1 has been amended to include the features that the ring structure is disposed on a portion of the insulating layer, and that the different surface conductivities as between the guard ring and the remaining portion of the surface of the insulating layer increase an amount of time in which the potential of the channel region equals the potential of the guard ring. Support for these features is in the specification as filed.

The Office Action contends that Frerichs discloses all of the features in claim 1, except for the ring structure having a surface conductivity different from a surface conductivity of a remaining portion of the surface of the insulating layer. The Office Action further contends that Tada discloses in FIG. 34a a ring structure (207 along with 220, formed of resistive aluminum) having a surface conductivity different from a surface conductivity of a remaining portion (Fig. 34b, items 211 and 212). The Office Action contends that items 211 and 212 in FIG. 34b of Tada are insulation films, and are of similar structure as the field oxide film (8) in FIG. 2 of Tada. Further, the Office Action

contends that it is well known that field oxide is synonymous with thick silicon dioxide.

The Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to improve upon the ring structure of Frerichs by using the teachings of Tada to create a field plate with annular ring structures of a second conductivity type. The Office Action contends that motivations to do so include the desirability of having a uniform potential gradient across the field oxide film (Tada column 18, line 16), avoiding voltage concentrations between the gate and drain regions, and reduction of the intensity of the electric fields associated with PN junction termination.

Assuming for the moment without admitting that Frerichs and Tada are even properly combinable, it is respectfully submitted that nowhere in Tada is there teaching that different surface conductivities are formed between the channel region and the conductive guard ring, in particular to increase an amount of time in which the potential of the channel region equals the potential of the conductive guard ring. Items 211 and 212 in Tada are interlayer insulation films (column 14, lines 30-32) that are disposed entirely beneath the two aluminum layers 207, 220 (FIG. 34b). In contrast, in amended claim 15 there is a remaining portion of the surface of the insulating layer after the ring structure has occupied a portion of the surface of the insulating layer. Thus, in Tada the relationship between the films 211, 212 and the aluminum layers 207, 220 is not the same as in amended claim 1. More importantly, this relationship in amended claim 1 allows for the increase in an amount of time in which the potential of the channel region equals the potential of the conductive guard ring. Such a relationship and the increase in time are not taught by Tada.

Further, in amended claim 1 the conductive guard ring is disposed outside the channel region which itself is located between the source and drain. As such, the equal potential occurs between the guard ring and the channel, which is different than Tada. In Tada column 18, lines 12-21, the

uniform potential gradient is in the spiral thin film formed on the field oxide film, where the spiral thin film is located between the source electrode and drain electrode. Thus, it is submitted that the alleged motivation to combine Tada with Frerichs to have a uniform potential gradient across the field oxide film (Col. 18, line 16 of Tada) is not applicable to the features of amended claim 1.

In light of the foregoing, it is respectfully submitted that amended claim 1 is presently in condition for allowance and should be passed to issuance.

Claims 2-7

It is respectfully submitted that the rejection of these claims is moot, since each of these claims depends directly or indirectly from claim 1, which is patentable for at least the reasons set forth above.

Claim 15

Similar to claim 1, claim 15 has been amended to include the features that the ring structure is disposed on a portion of the insulating layer, and that the different surface conductivities as between the guard ring and the remaining portion of the surface of the insulating layer increase an amount of time in which the potential of the channel region equals the potential of the guard ring. Support for these features is in the specification as filed.

The Office Action contends that Frerichs discloses all of the features in claim 15, except for the ring structure having a surface conductivity different from a surface conductivity of a remaining portion of the surface of the insulating layer. The Office Action further contends that Tada discloses in FIG. 34a a ring structure (207 along with 220, formed of resistive aluminum) having a surface conductivity different from a surface conductivity of a remaining portion (Fig. 34b, items 211 and

212). The Office Action contends that items 211 and 212 in FIG. 34b of Tada are insulation films, and are of similar structure as the field oxide film (8) in FIG. 2 of Tada. Further, the Office Action contends that it is well known that field oxide is synonymous with thick silicon dioxide.

The Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to improve upon the ring structure of Frerichs by using the teachings of Tada to create a field plate with annular ring structures of a second conductivity type. The Office Action contends that motivations to do so include the desirability of having a uniform potential gradient across the field oxide film (Tada column 18, line 16), avoiding voltage concentrations between the gate and drain regions, and reduction of the intensity of the electric fields associated with PN junction termination.

Assuming for the moment without admitting that Frerichs and Tada are even properly combinable, it is respectfully submitted that nowhere in Tada is there teaching that different surface conductivities are formed between the channel region and the conductive guard ring, in particular to increase an amount of time in which the potential of the channel region equals the potential of the conductive guard ring. Items 211 and 212 in Tada are interlayer insulation films (column 14, lines 30-32) that are disposed entirely beneath the two aluminum layers 207, 220 (FIG. 34b). In contrast, in amended claim 15 there is a remaining portion of the surface of the insulating layer after the ring structure has occupied a portion of the surface of the insulating layer. Thus, in Tada the relationship between the films 211, 212 and the aluminum layers 207, 220 is not the same as in amended claim 1. More importantly, this relationship in amended claim 1 allows for the increase in an amount of time in which the potential of the channel region equals the potential of the conductive guard ring. Such a relationship and the increase in time are not taught by Tada.

Further, in amended claim 15 the conductive guard ring is disposed outside the channel

region which itself is located between the source and drain. As such, the equal potential occurs between the guard ring and the channel, which is different than Tada. In Tada column 18, lines 12-21, the uniform potential gradient is in the spiral thin film formed on the field oxide film, where the spiral thin film is located between the source electrode and drain electrode. Thus, it is submitted that the alleged motivation to combine Tada with Frerichs to have a uniform potential gradient across the field oxide film (Col. 18, line 16 of Tada) is not applicable to the features of amended claim 15.

In light of the foregoing, it is respectfully submitted that amended claim 15 is presently in condition for allowance and should be passed to issuance.

Claims 16-20

It is respectfully submitted that the rejection of these claims is moot, since each of these claims depends directly from claim 15, which is patentable for at least the reasons set forth above.

5. Claims 8-14 currently stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Frerichs and Tada as applied to claims 1-7 above, and further in view of a technical document to Paris, R. (hereinafter "Paris").

Claim 8

Similar to claims 1 and 15 discussed above, claim 8 has been amended to include the features that the ring structure is disposed on a portion of the insulating layer, and that the different surface conductivities as between the guard ring and the remaining portion of the surface of the insulating layer increase an amount of time in which the potential of the channel region equals the potential of the guard ring. Support for these features is in the specification as filed.

In a similar manner to claims 1 and 15 discussed above, the Office Action contends that

Frerichs discloses all of the features in claim 8, except for the ring structure having a surface conductivity different from a surface conductivity of a remaining portion of the surface of the insulating layer. The Office Action further contends that Tada discloses in FIG. 34a a ring structure (207 along with 220, formed of resistive aluminum) having a surface conductivity different from a surface conductivity of a remaining portion (Fig. 34b, items 211 and 212). In addition, the Office Action contends that the combination of Frerichs and Tada, as applied to claims 1-7, does not teach a source and drain forming a field-effect transistor, the transistor being spatially separated from the air gap between the gate layer and the channel region, the transistor having a gate that is connected by an electrode to the channel region. The Office Action contends that Paris discloses in FIG. 1 a source and drain forming a field-effect transistor (item FET in the figure), the transistor being spatially separated from the air gap (area bounded by the gate, nitride, and distance pieces) between the gate layer and the channel region (area under the substrate between the guard rings), the transistor having a gate that is connected by an electrode to the channel region.

The Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to create a capacitively controlled transistor by adding the teachings of Paris to the device already created by Frerichs and Tada. The Office Action contends that the motivation to do so includes the positive effect of the CCFET structure in regards to temperature dependency and long term stability (Paris, Page 424).

In response, similar to the discussion above with respect to claims 1 and 15, here the Applicant challenges the teachings of Tada. Specifically, assuming for the moment without admitting that Frerichs and Tada are even properly combinable, it is respectfully submitted that nowhere in Tada is there teaching that different surface conductivities are formed between the channel region and the conductive guard ring, in particular to increase an amount of time in which

the potential of the channel region equals the potential of the conductive guard ring. Items 211 and 212 in Tada are interlayer insulation films (column 14, lines 30-32) that are disposed entirely beneath the two aluminum layers 207, 220 (FIG. 34b). In contrast, in amended claim 15 there is a remaining portion of the surface of the insulating layer after the ring structure has occupied a portion of the surface of the insulating layer. Thus, in Tada the relationship between the films 211, 212 and the aluminum layers 207, 220 is not the same as in amended claim 1. More importantly, this relationship in amended claim 1 allows for the increase in an amount of time in which the potential of the channel region equals the potential of the conductive guard ring. Such a relationship and the increase in time are not taught by Tada.

Further, in amended claim 8 the conductive guard ring is disposed outside the channel region which itself is located between the source and drain. As such, the equal potential occurs between the guard ring and the channel, which is different than Tada. In Tada column 18, lines 12-21, the uniform potential gradient is in the spiral thin film formed on the field oxide film, where the spiral thin film is located between the source electrode and drain electrode. Thus, it is submitted that the alleged motivation to combine Tada with Frerichs to have a uniform potential gradient across the field oxide film (Col. 18, line 16 of Tada) is not applicable to the features of amended claim 8.

In light of the foregoing, it is respectfully submitted that amended claim 8 is presently in condition for allowance and should be passed to issuance.

Claims 9-14

It is respectfully submitted that the rejection of these claims is moot, since each of these claims depends directly from claim 8, which is patentable for at least the reasons set forth above.

For all the foregoing reasons, reconsideration and allowance of claims 1-20 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,

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